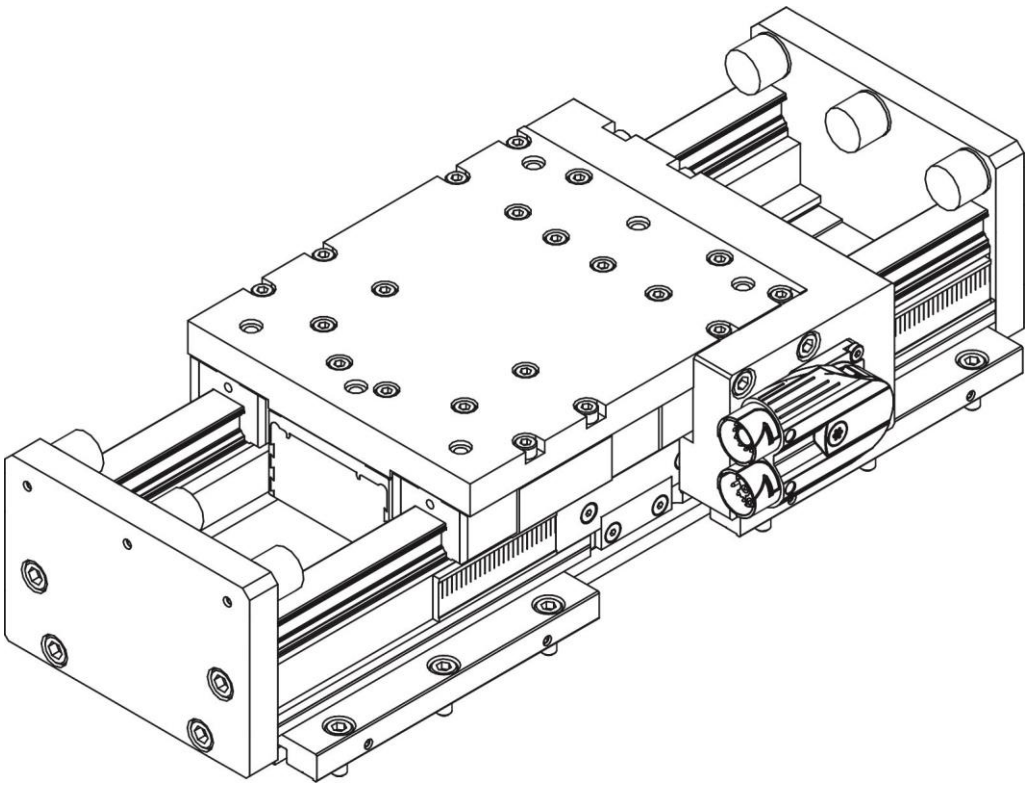
Operating Instructions

Product name: euroLINE 120
Product ID: 1131236



Translation (EN) of the original instructions (DE)

IEF-Werner GmbH | Wendelhofstraße 6 | DE-78120 Furtwangen | www.ief-werner.de

Use

- The operating instructions must be available at the component at all times.
- The operating instructions are an integral part of the component/device.
- Always use the complete original (or the original translation) of these operating instructions.

Supplier & Manufacturer

IEF-Werner GmbH
Wendelhofstraße 6
78120 Furtwangen - Germany
Phone: 07723-925-0
Telefax: 07723-925-100
www.ief-werner.de
info@ief-werner.de

Service

Find your IEF service station on our website:

- http://www.ief-werner.de

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Change History

Document Code	Date	Modification
MAN_EN_1131236_euroLINE120_R1a.doc	October 2014	Release of this document
MAN_EN_1131236_euroLINE120_R1b.doc	February 2015	Changing lubricant into Dynalub (see section 6.2, 🗎 36). Section “Compensation of encoder” added (see section 5, 🗎 27 onwards). Section “Precautions by replacing the carriage” added (see section 6.3, 🗎 37).

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1 Declaration of Incorporation

EC declaration of incorporation in the sense of the EC directive 2006/42/EC (machinery), Annex II B

The manufacturer:
IEF-Werner GmbH
Wendelhofstraße 6
78120 Furtwangen - Germany

hereby declares that the following products (the incomplete machine/partial machine):

Designation	IEF-Werner parts group number
euroLINE 120	TG1002844

where possible based on the scope of delivery, corresponds to the following basic requirements of the directive on Machinery (2006/42/EC):
Annex I, item: 1.1.2; 1.1.3; 1.1.5; 1.3.2; 1.3.4; 1.5.1; 1.7.3; 1.7.4.

The incomplete machine also corresponds to the following further directives:
Directive 2004/108/EC of the council, dated 15 December 2004, for harmonisation of the legal provisions of the member states on electromagnetic compatibility.
Directive 2006/95/EC of the council, dated 12 December 2006, for harmonisation of the legislation of the member states regarding electrical equipment for use within specified voltage thresholds.

The technical documents were generated according to Annex VII part B and may be electronically submitted to the national authorities upon justified request.
List of some applied harmonised standards:
DIN EN ISO 12100-1,-2 / DIN EN ISO 13857 / DIN EN ISO 13850 / DIN EN 60204-1

Commissioning of the incomplete machine delivered by us is not permitted until it has been determined that the overall system into which the incomplete machine is installed meets the basic safety and health protection requirements according to Annex I of the above EC directive 2006/42/EC.

Name of the documentation officer: Frank Reichelt, technical editor
Address of the documentation officer: see manufacturer's address.

Furtwangen, October 2014 Manfred Bär (managing director)

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2 Safety

2.1 Definition of Warning Notes

⚠ DANGER

Indicates danger.

Non-observance of the safety provisions causes death.

⚠ WARNING

Indicates potential danger.

Non-observance of the safety provisions may cause death or severe injury.

⚠ CAUTION

Indicates potential danger.

Non-observance of the safety provisions may cause injury.

ATTENTION

Indicates potential danger. Non-observance of the safety provisions may cause property damage.

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2.2 General Warning Notes

The linear unit euroLINE 120 must only be commissioned by specialists who received safety-technical instruction and are able to assess potential dangers. Furthermore, all chapters of these operating instructions must have been read and understood completely.

⚠ WARNING

Warning of dangerous electrical voltage.

The system must be powered down for all assembly, disassembly or repair work. Non-observance of the safety provisions may cause death.

⚠ WARNING

Linear modules must only be operated with their protective device/s.

Linear modules always have to be operated in connection with suitable safety devices (e.g., safety cell, protective room, protective housing, light curtain).

⚠ CAUTION

Do not remove plugs or clamps when live.

Motor connectors or clamps must not be inserted or disconnected when live. Risk of burning of the contacts and risk of flying sparks.

⚠ CAUTION

Warning of hot surface.

During operation, the heated drive may cause skin burns when touched. Install a protective device, if possible! Do not touch the marked areas or wait for an adequate cooling time.

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2.3 Special Hazard Warnings

In addition, this operating instructions also contains the following special hazard warnings:

⚠ DANGER

Danger to persons with pacers.

There are considerable dangers for persons with pacers or other electronic implants. Strong magnetic fields may impair implants, which may influence the pulse of wearers of pacers in extreme cases. Persons with the above impairments must not stay close to the linear unit euroLINE 120.

⚠ DANGER

Warning of electric shock.

The linear unit euroLINE 120 with motor and encoder connections is live. You may suffer fatal electric shock when touching a component.

⚠ WARNING

Warning of shearing off of limbs.

These points of the components pose the danger of shearing off of limbs in operation.

⚠ WARNING

Warning of crushing of limbs.

These points of the components pose the danger of crushing of limbs in operation.

ATTENTION

There are strong permanent magnets in the basic body that may damage magnetic data carriers (e.g. credit cards).

ATTENTION

The linear unit euroLINE 120 must not be used in the proximity of magnetic dusts and small parts!

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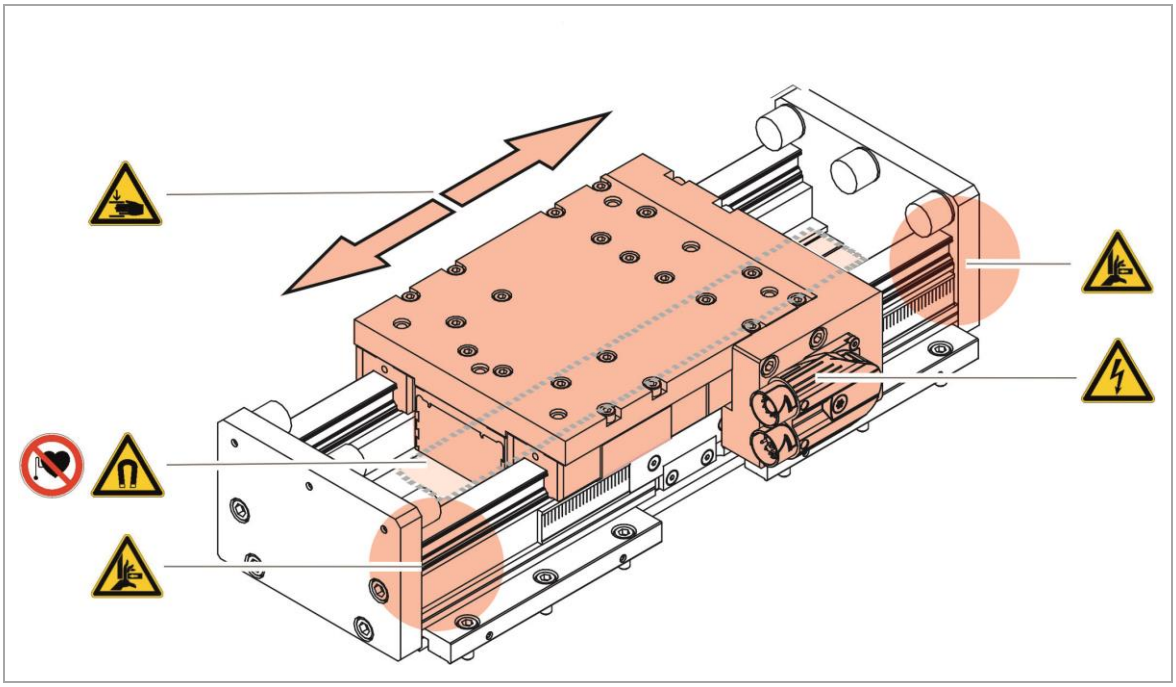

Figure 1 Dangers at the euroLINE 120

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3 Intended Use

The linear unit euroLINE 120 is a precise, linear adjustment unit with an iron-applied linear motor that is used in the commercial area as an attachment part in connection with other components. In combination with many standardised assembly elements, as well as the other linear units of IEF-Werner GmbH, it can be used to build complex multi-axis positioning systems as well.

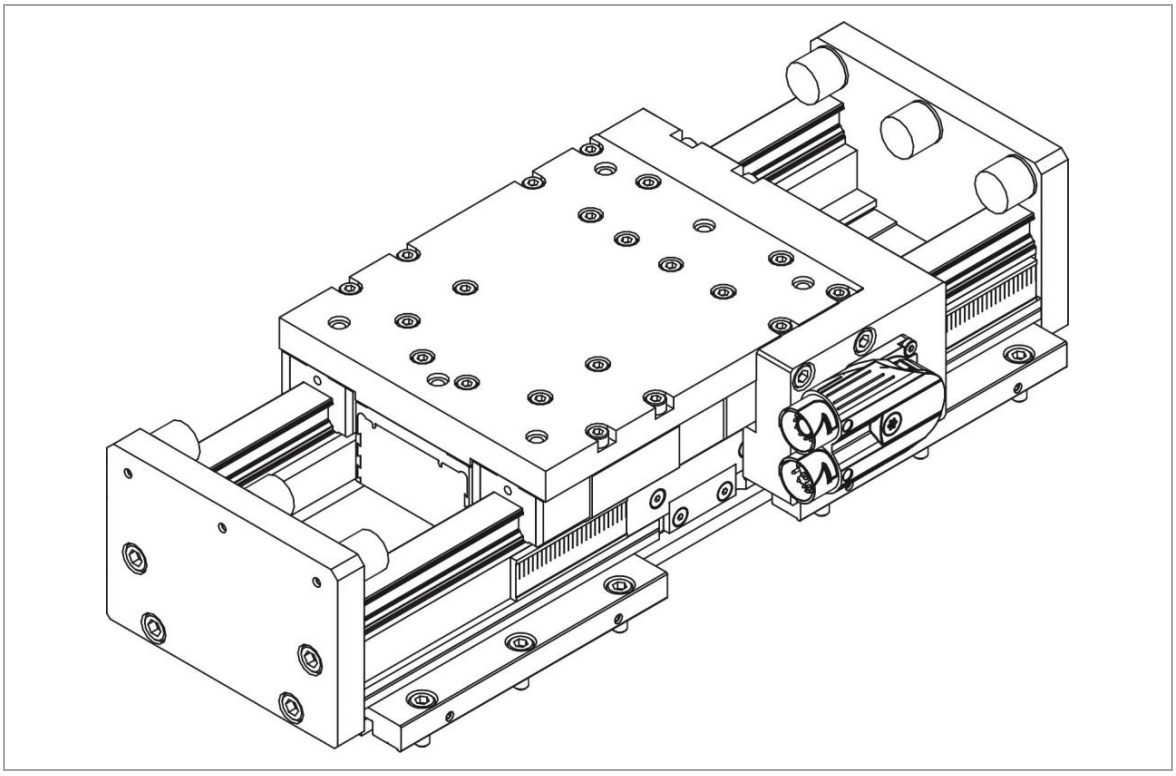

Figure 2 Linear unit euroLINE 120

Areas of use of the euroLINE 120 include:

- Component insertion systems
- Handling of small parts
- Loading and unloading stations
- Measuring and test technology
- etc.

3.1 Reasonably foreseeable Misuse

The linear unit euroLINE 120 is not to be used for certain applications such as the transport of persons and animals or as a pressing/bending device for cold working of metal.

Use of the linear unit without additional measures is also not possible in special fields of application, such as the chemical or food industry or in explosive atmospheres.

In case of doubt, consult the manufacturer.

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4 Assembly Instructions

4.1 Installation Position

The linear unit euroLINE 120 is only intended for horizontal use. The carriage movement must be horizontal. Vertical use is not intended.

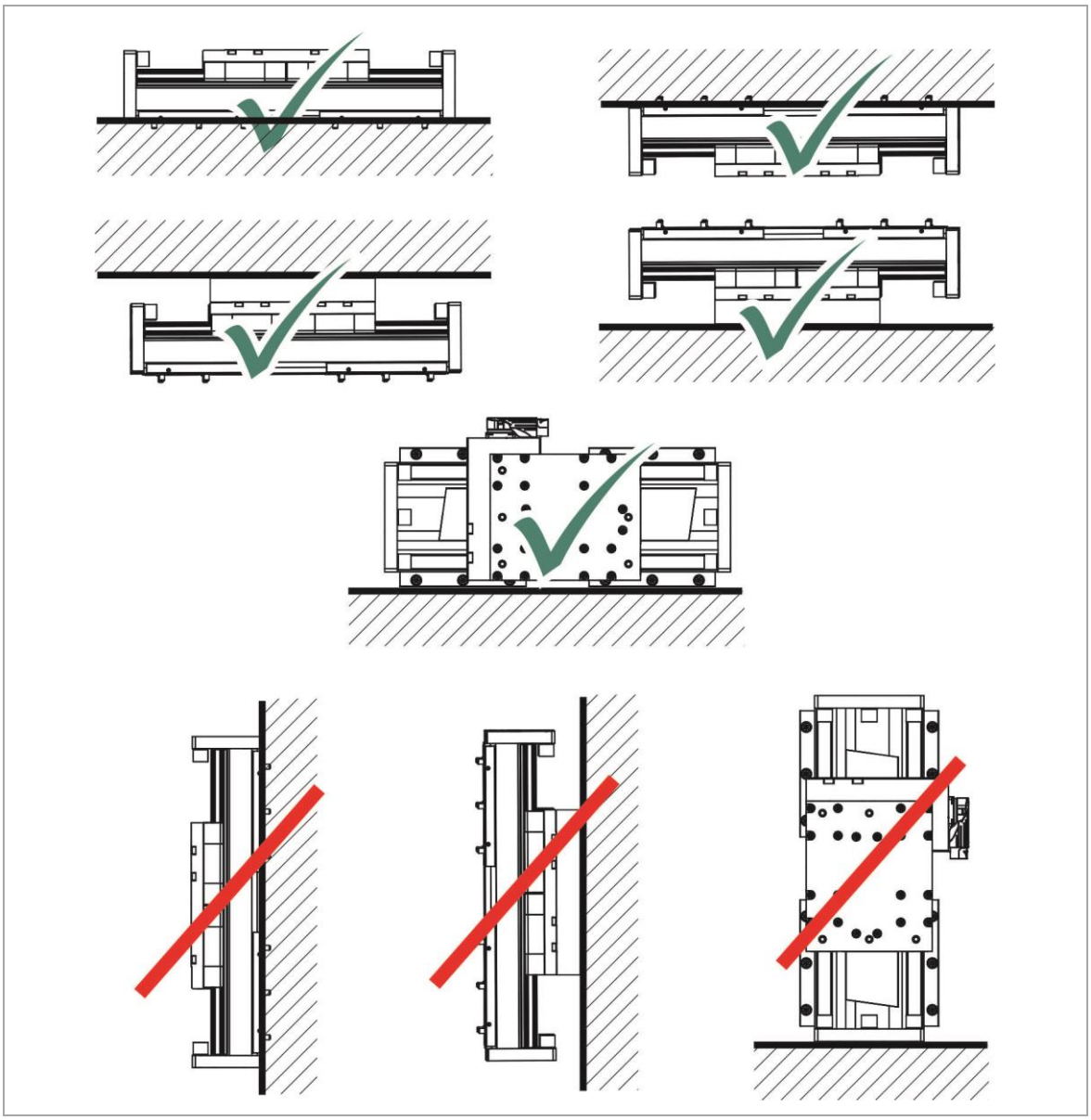

Figure 3 Linear unit euroLINE 120, horizontal use

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4.2 Transverse Installation

For cross installation of the linear unit euroLINE 120, there are clamping elements in standard lengths (centering ring, clamping elements).

Many axle combinations can be implemented.

Examples:

- Multiple axle carriage systems
- X/Y system
- X/Y portal system

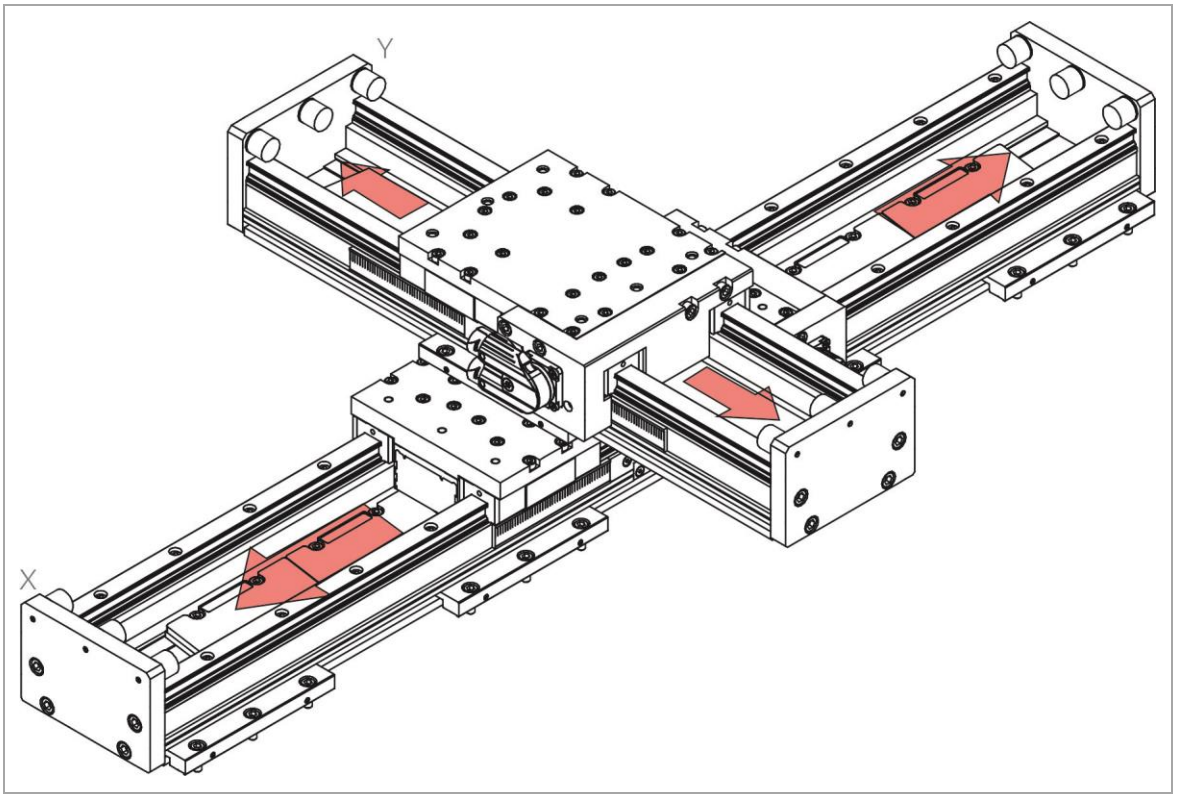

Figure 4 X/Y system

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4.3 Attachment

The euroLINE 120 can be attached to the basic body with clamping elements or to the carriage via the 2 x 3 M5-threaded bores (see Figure 5).

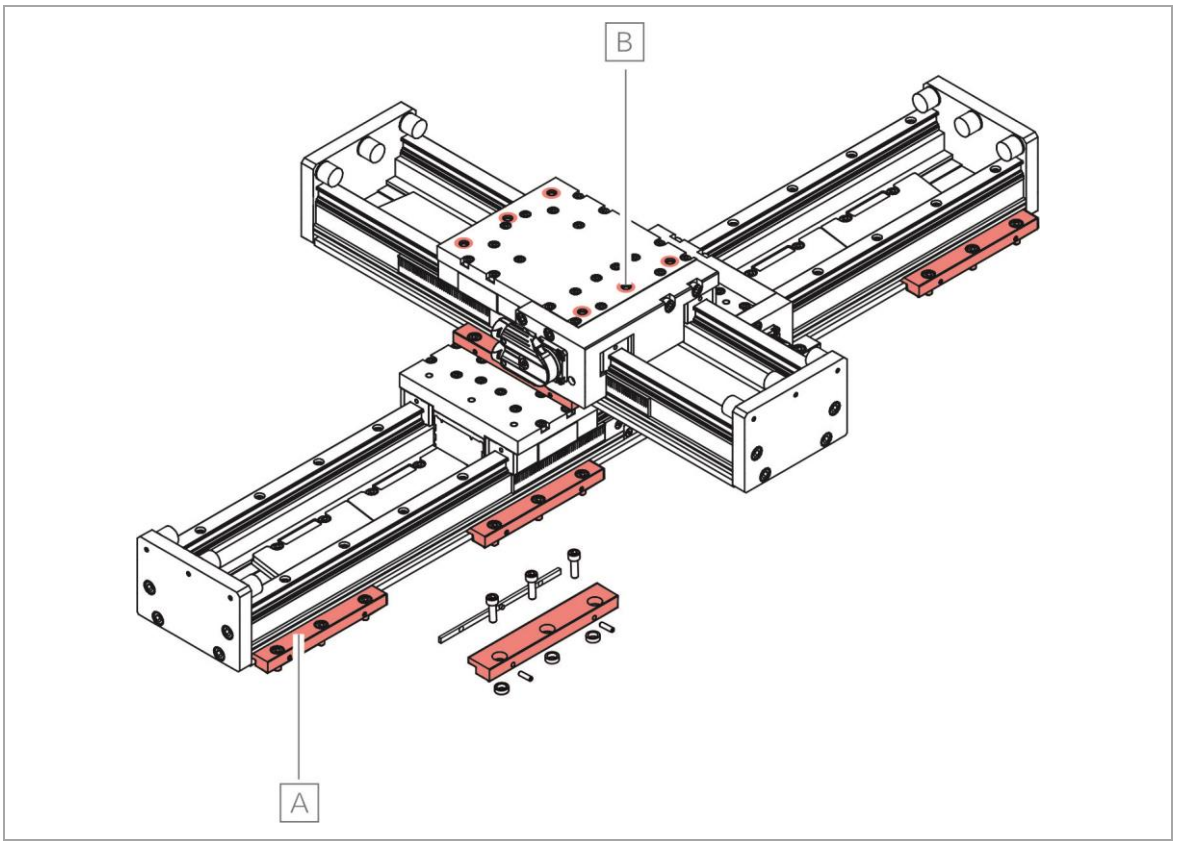

Figure 5 Attachment to the basic body with the help of clamping elements

A Type euroLINE 120 clamping element

B M5 threaded bores, 2 x 3 pieces (see Figure 6 and Figure 7, 18)

The installation area has to be a flat surface. Any deviations from an ideal flat plane directly affect the processing precision.

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4.3.1 Installation of Actuators

The actuators (cylinders, pick-up modules, etc.) that are to be installed on the euroLINE 120 linear unit can be attached via the drilling pattern on the carriage.

The corresponding drilling templates are available for the two possible carriage sizes.

The position tolerance of the centering bores 7^{H7} is specified at ± 0.01mm.

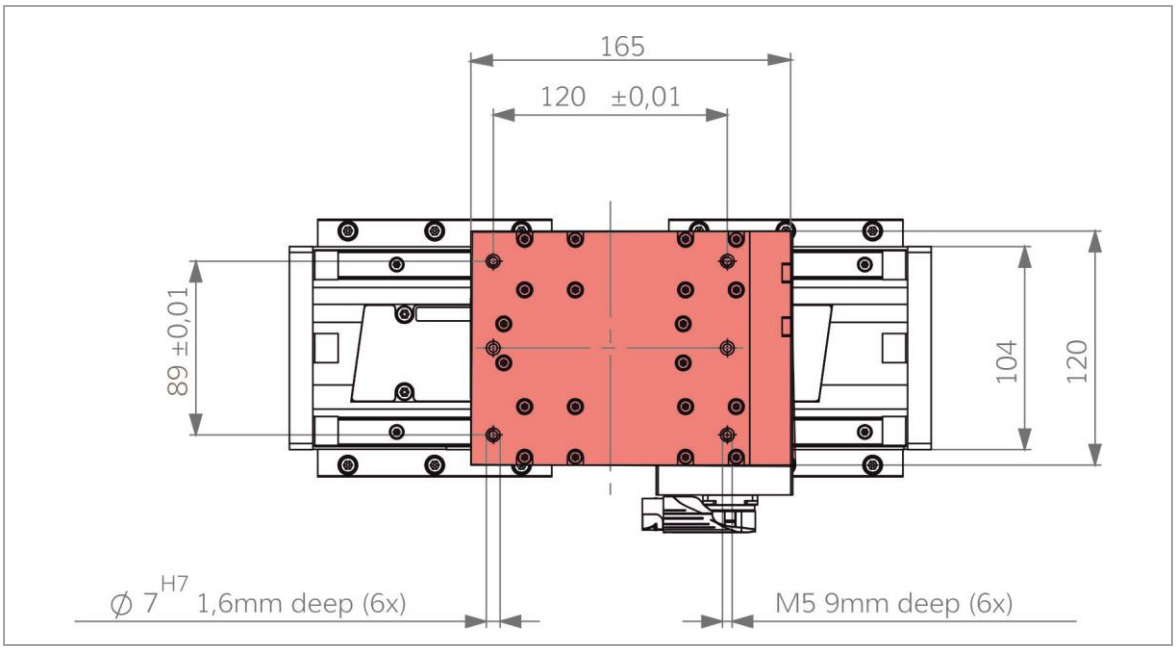

Figure 6 euroLINE 120, standard carriage, length 165 mm

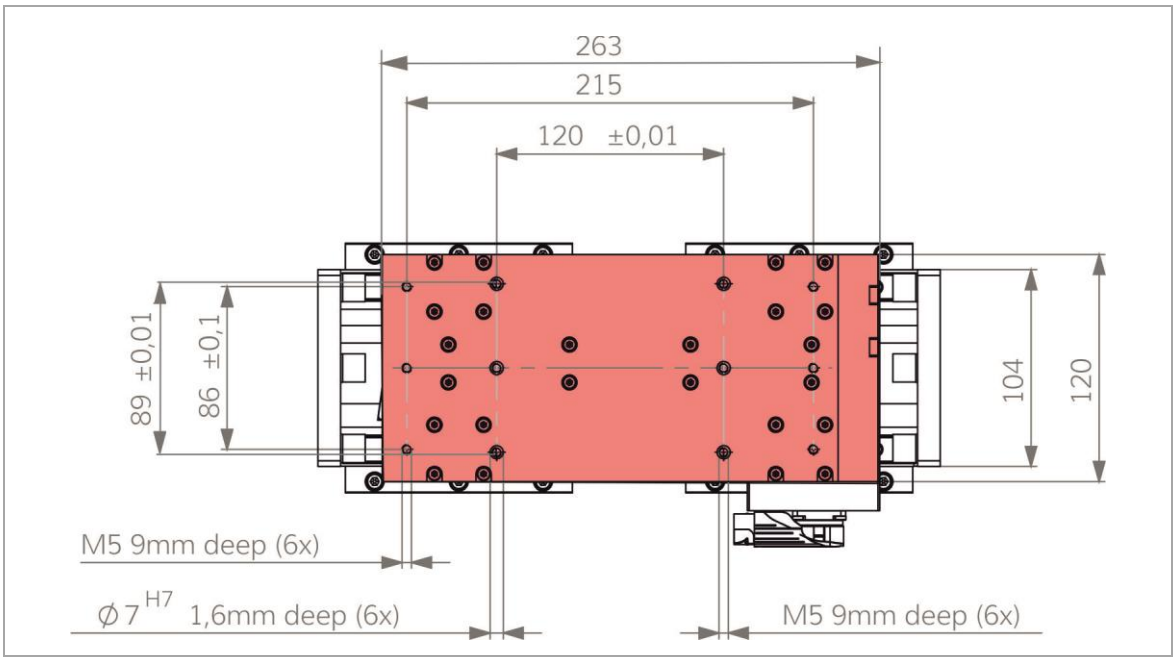

Figure 7 euroLINE 120, long carriage, length 263 mm

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4.4 Wiring

There are a motor plug and an encoder plug at the terminal box:

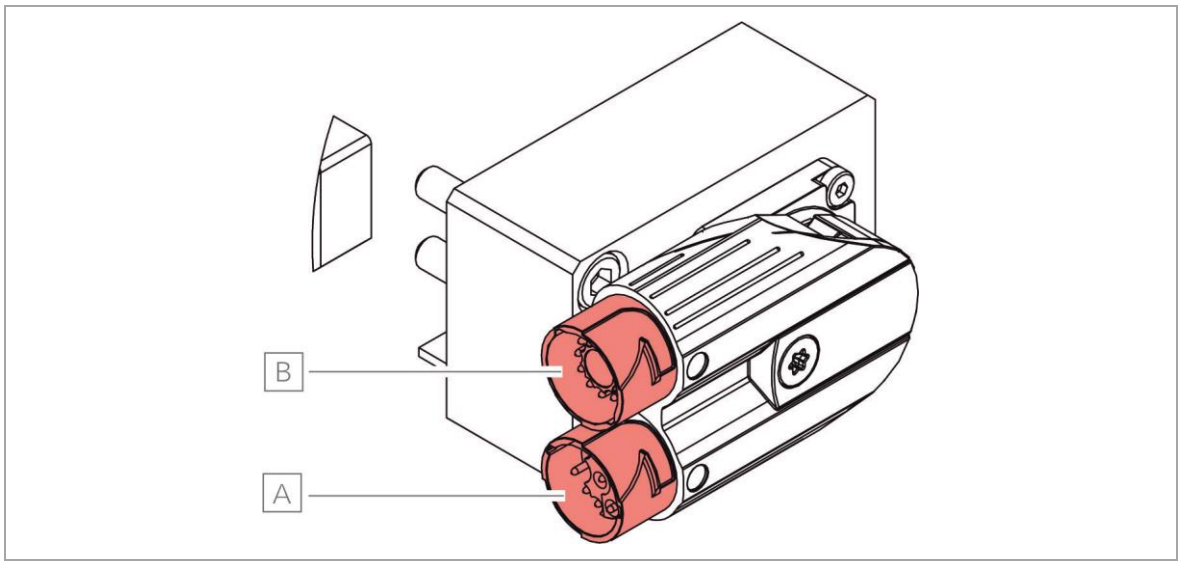

Figure 8 Motor plug and encoder plug

A Motor plug B Encoder plug

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4.4.1 Motor Cable

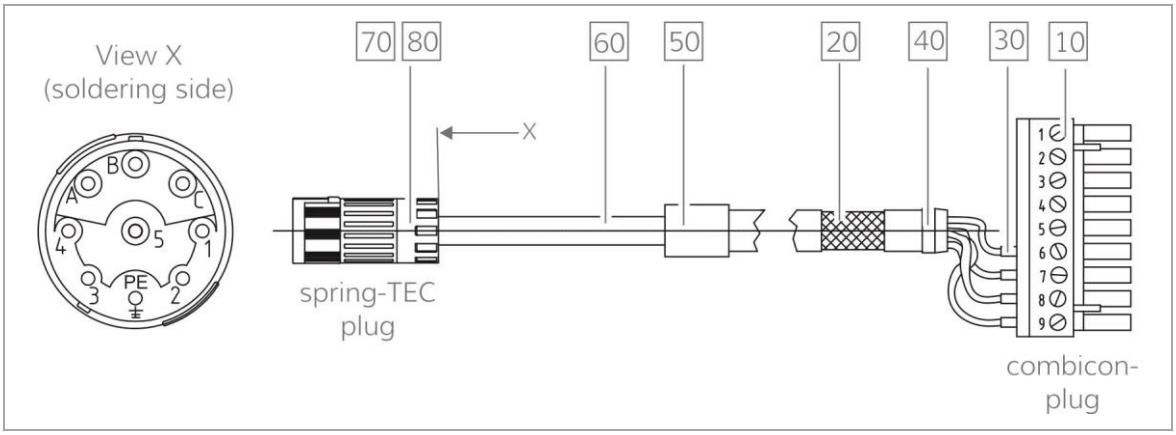

Figure 9 Motor cable with spring-TEC- and combicon plug

Parts list for motor cable with spring-TEC plug (item no.: 1119851).

Drawing item	Article no.	Designation
10	1068946	Plug-in unit, type: PC5/9-ST1-7.62
20	733086	Copper adhesive type, conductive 0.09 x 19 mm
30	726875	Wire-end sleeve, yellow, type 1.0/8 yellow
40	730076	Shrink hose, black, CGPT 12.7/6.4-0
50	1017996	Cable marker, type: KMT-07323V-9
60	730790	Motor line 5 x 1.00 mm² shielded
70	1113957	Plug 915, press-on sleeve orange 9-pin, type: ESTA202NN00320500000
80	1113999	Contact sleeve Ø 1 mm, crimp area 0.5 – 1.5 mm², type : 60.251.11

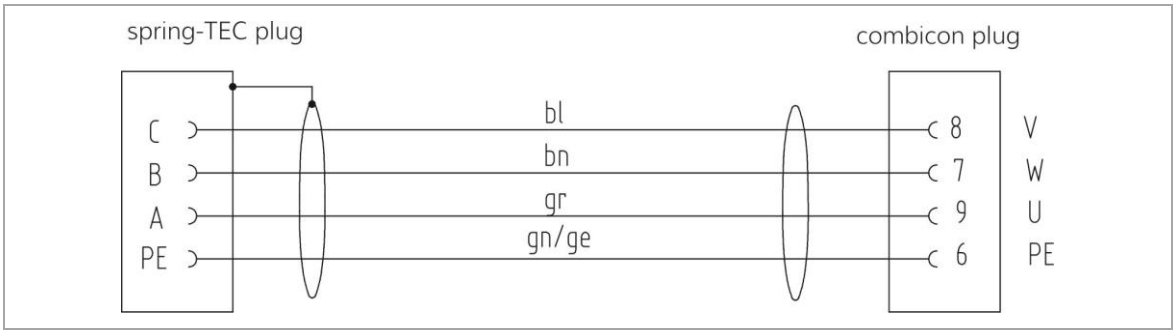

Figure 10 Motor cable connections

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4.4.2 Encoder Cable

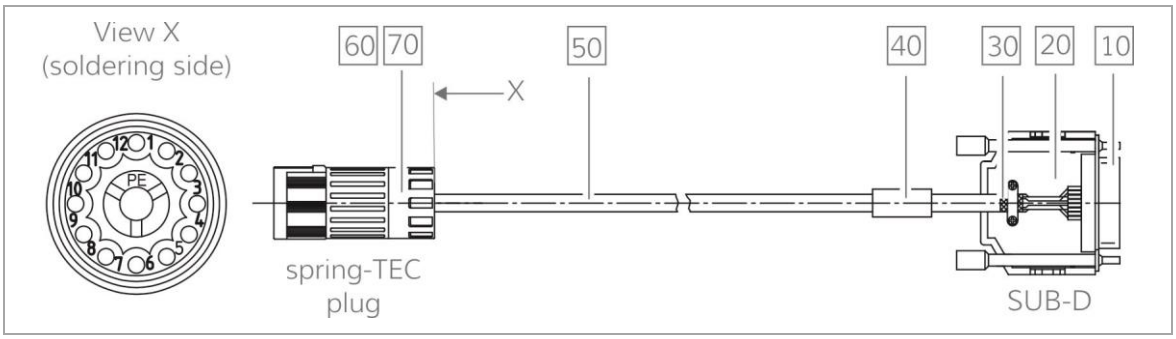

Figure 11 Encoder cable with spring-TEC- and SUB-D plug

Parts list for encoder cable (EnDAT) with spring-TEC plug (item no.: 1119854).

Drawing item	Article no.	Designation
10	725692	Pin strip Sub-D-15 solder cup
20	731798	Housing Sub-D-15 metallised
30	733964	Copper adhesive type, conductive 0.09 x 9 type: 1181
40	1017996	Cable marker, type: KMT-07323V-9
50	1023746	Cable EnDat 7 x 2 x 0.25 mm^2, C-UL orange, type: servoTEC
60	1113994	Plug 615, press-on sleeve green; 12-pin, type: ESTA002NN00320001000
70	1114000	Contact sleeve Ø 1mm, crimp area 0.5 – 0.75 mm^2, type : 60.252.11

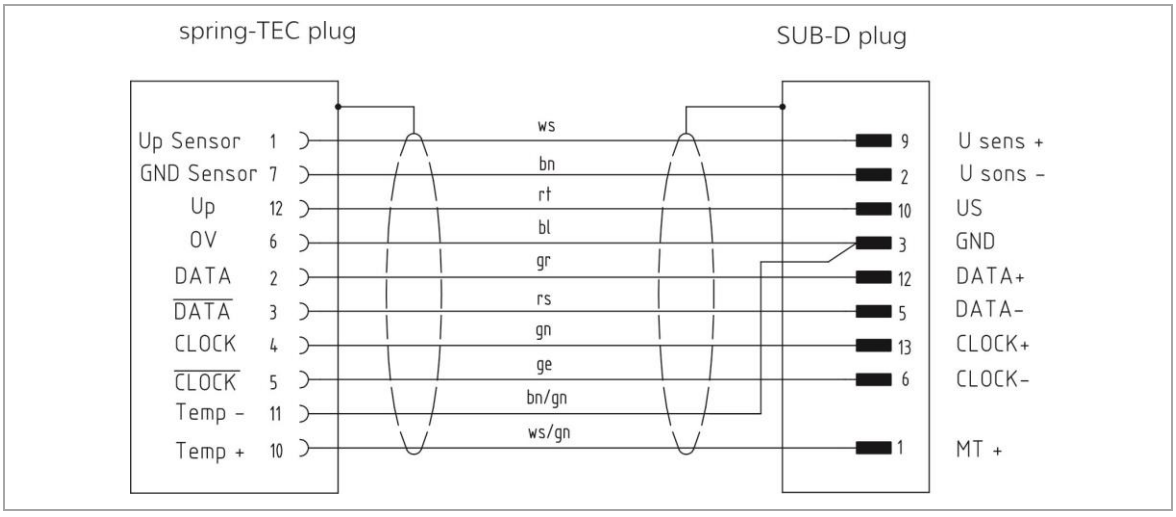

Figure 12 Connections encoder cable

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4.4.3 Cable Routing

For all moving cables, suitable cable routing has to be used to effectively prevent cable breaks. The minimum radius r_{min} for cable routing chains is calculated for IEF-Werner cables according to the following formula:

$$r_{min} \geq 10 \times \text{cable diameter}$$

When different cables are used, EN 60204 must be observed. In addition, it must be ensured that a space reserve of 30% is kept free within the routing chains. A strain relief for the cables has to be attached at the outlet of the cable routing chain.

We recommend purchasing genuine cables and energy chains from IEF-Werner GmbH. Please contact us. We will gladly advise you.

4.4.4 Measuring System

Absolute measuring system EnDAT 2.2 (Heidenhain)

4.4.5 Temperature Sensor

PTC thermistor with the following characteristics:

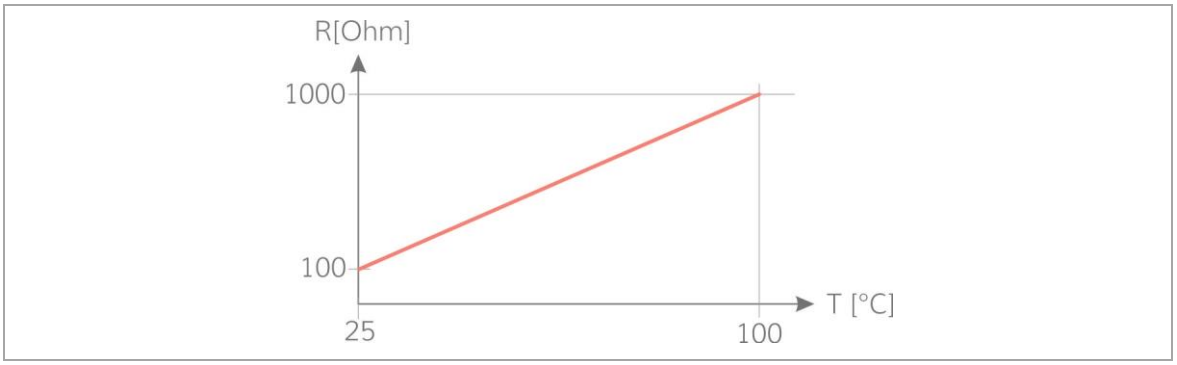

Figure 13 Chart PTC

The resistance increases roughly linear with the temperature.

4.4.6 Installation Situation Measuring System

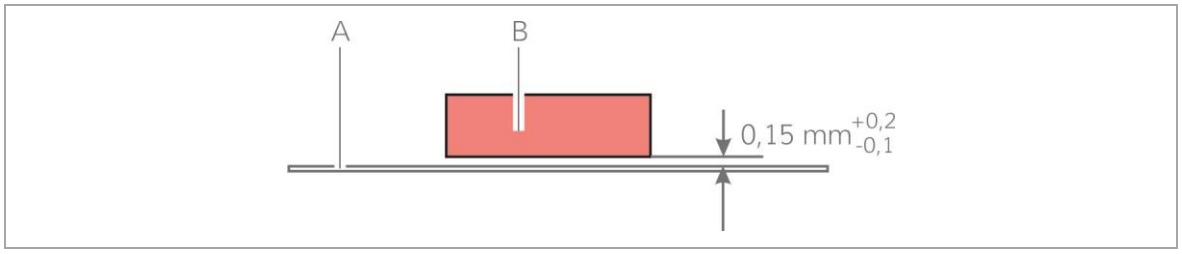

Figure 14 Distance measuring tape to measuring head

A Measuring tape B Measuring head

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4.5 Technical Data

4.5.1 Tightening Torques for Screw Connection [Nm]

Strength class	M2.5	M3	M4	M5	M6	M8
8.8	0.5	1.28	2.7	5.5	9.5	23
10.9	0.8	1.8	3.8	8	13	32
12.9	1.0	2.1	4.6	9.5	16	39

4.5.2 Technical Data of the Linear Unit euroLINE 120

		Carriage type (carriage length)							
Designation	Unit	Type standard carriage 165 mm				Type long carriage 263mm			
Length	[mm]	329	377	425	%ã929	377	425	473	%ã929
Stroke from	[mm]	114				64			
Stroke graduation	[mm]	48							
Basic weight basic body	[kg]	3.15							
Weight basic body per 48 mm	[kg]	0.453							
Measuring tape (bonded)		visual, steel							
Pole separation	[mm]	24							
Max. speed	[m/s]	5							
Rated feed force	[N]	120				240			
Peak force	[N]	210				420			
Rated current (at 20° ambience temperature)	[A]	3				6			
Peak current	[A]	6.2				12.4			
Magnetic tightening force	[N]	500				900			
Max. voltage (phase-phase)	[V/AC]	400							
Connections (rotating)		Y-Tec							
Measuring system (absolute)		EnDAT 2:2							
Resolution measuring system,	[µm]]	0.001							
Hopper lubrication nipple per guide carriage		1							
Weight carriage	[kg]	2.6				3.77			

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4.5.3 Type Plate

The type plates are attached in the following positions (carriage, basic body):

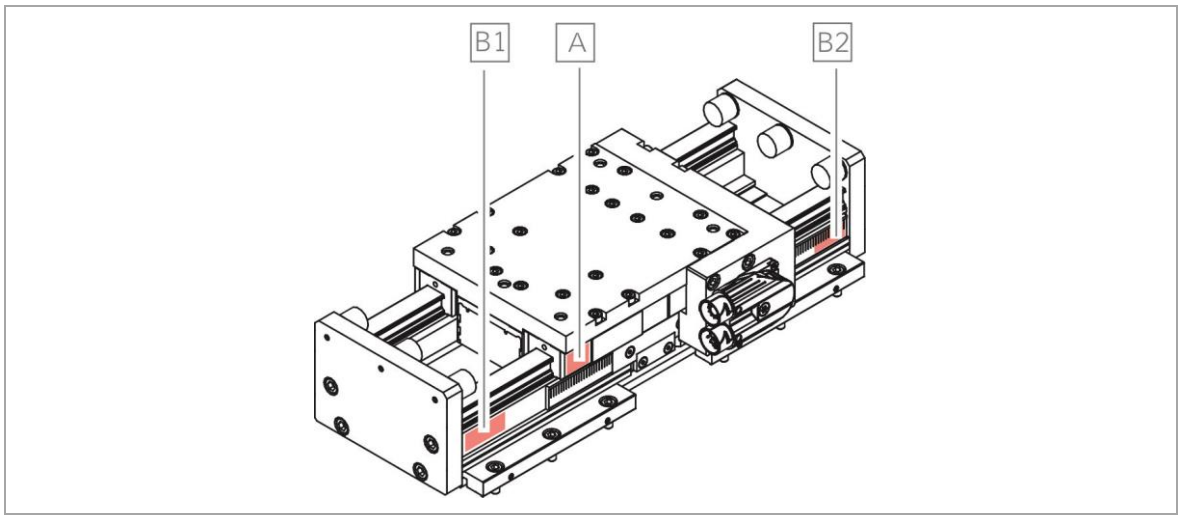

Figure 15 Positions of the type plates

A Type plate at the carriage

B Type plate at the basic body (B1 or B2)

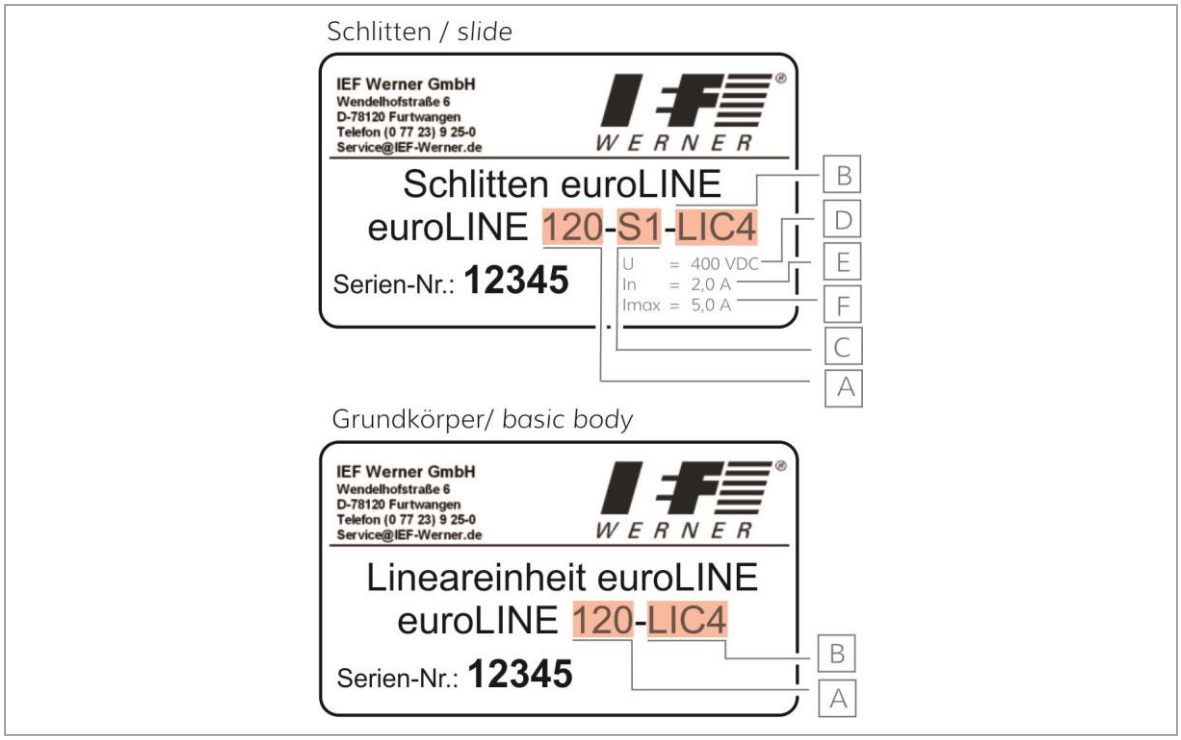

Figure 16 Type plates

A Size 120

B Type measuring system

C Coil type: S1=Standard-, S2=Long carriage

D Supply voltage servo amplifier (U)

E Rated current (I_N)

F Peak current (I_{max})

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4.5.4 Load Information

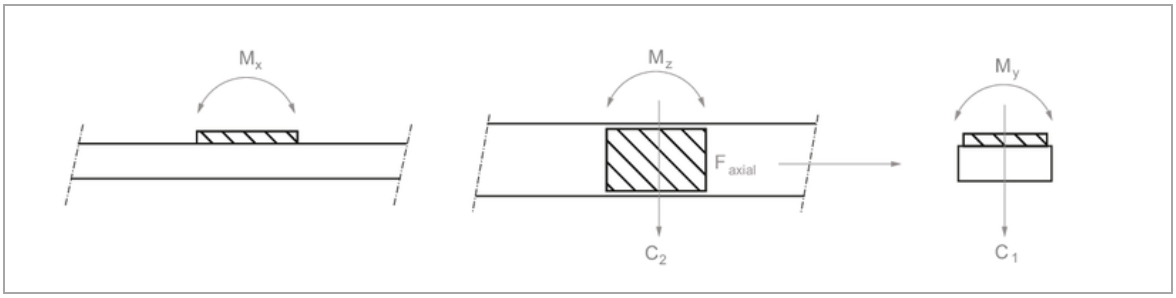

Figure 17 Torques

Parameter	Standard carriage	Long carriage
Max. torque Mx (theoretic)	250 Nm	250 Nm
Max. torque My	180 Nm	180 Nm
Max. torque Mz	200 Nm	250 Nm

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5 Compensation of encoder

If you install the first time a carriage with integrated measuring head and with a measuring tape, which is applied on the basic body, it should be done a so-called compensation of encoder.

For this purpose the software “S2-Commander” has to be installed on your PC and the PC has to be connected via an interface with the servo amplifier.

5.1 Define angle encoder

Proceed as follows, to load the motor specific parameter setting inside the measuring head (encoder):

(1) Select the icon „Encoder“ ( ) in the icon line of the S2 Commander.

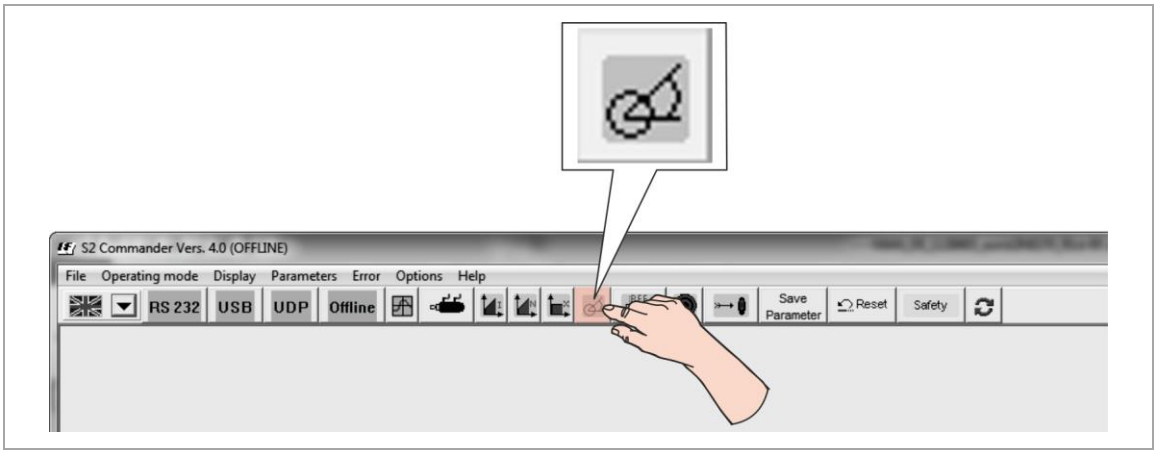

Figure 18 Select “Encoder” icon

(2) Select the button “Auto detect“(Auto detect).
Note: The controller release must be switched off!

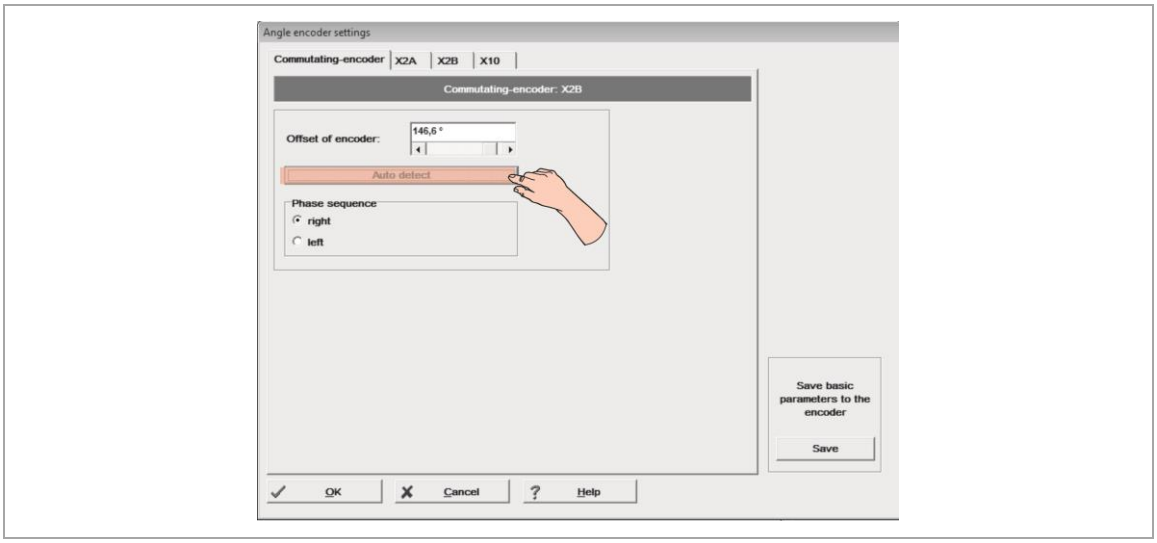

Figure 19 Select button “Auto detect”

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(3) Select the button "OK "in Motor identification window.
Note: The motor shaft must turn freely!

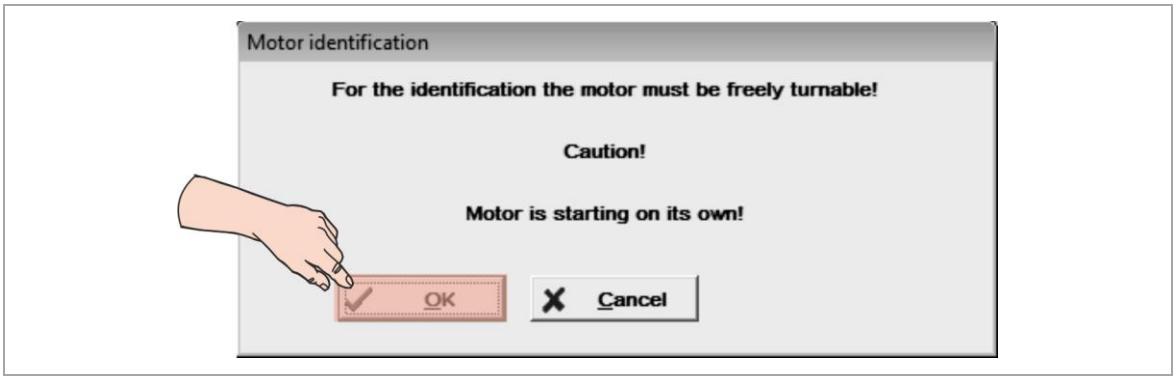

Figure 20 Select button "OK"

The axis starts moving.
The commutation (the automatically determination of the transducer angle) is running.

After successful commutation the following window will be displayed:

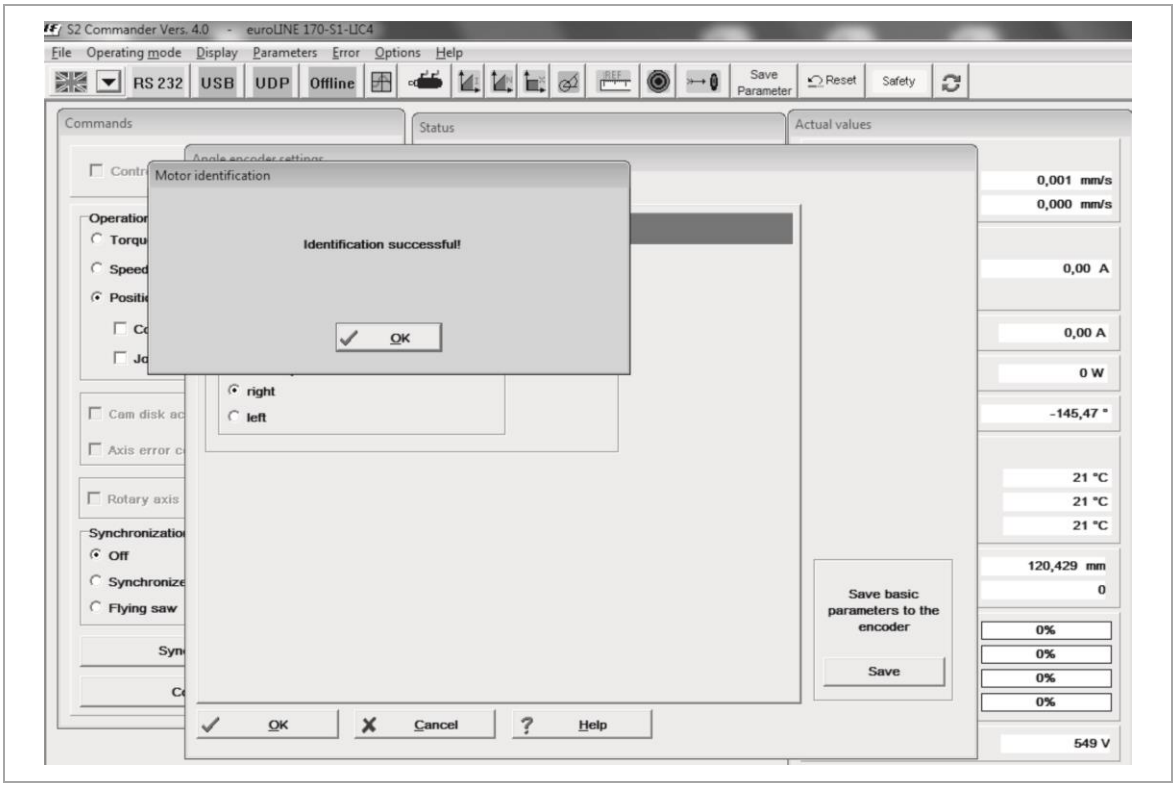

Figure 21 Displaying "Identification successful!"

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(4) Select the button "OK" in the Motor identification window (Identification successful!)

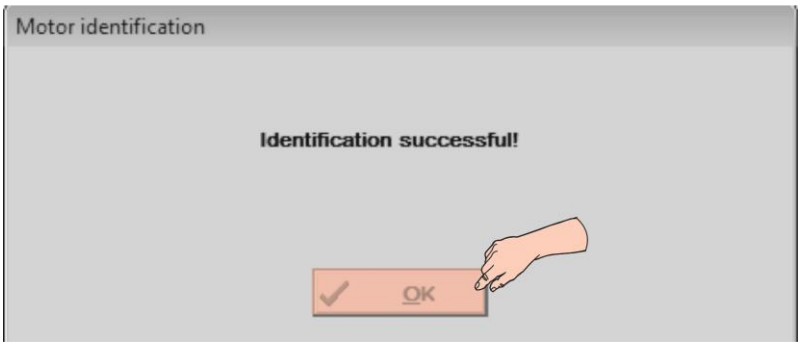

Figure 22 Select button "OK"

(5) Select the button "Save" in the Angle encoder settings window.

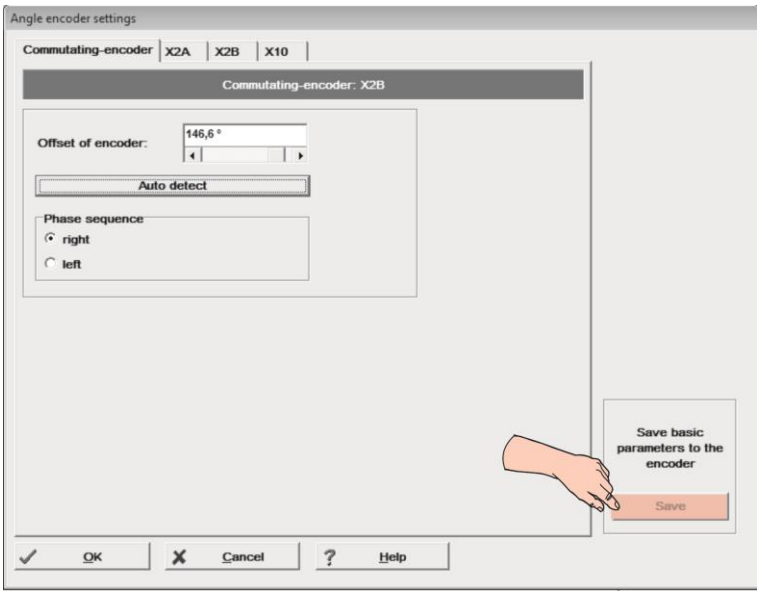

Figure 23 Select button "Save"

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(6) Select the “OK” button in the Save to encoder window.
Note: The power amplifier must be switched off!

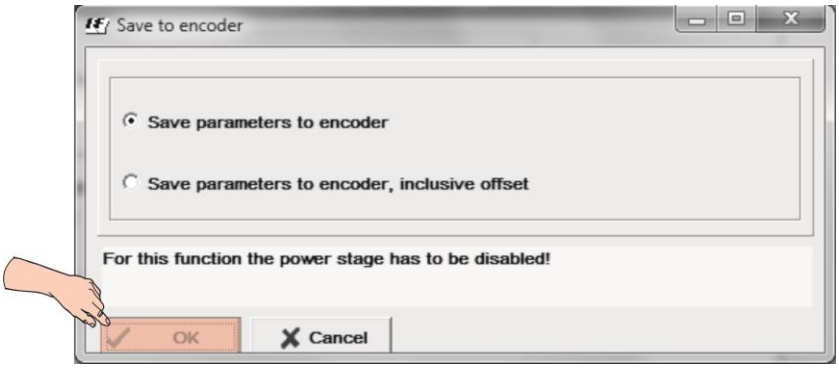
Save to encoder
Save parameters to encoder
Save parameters to encoder, inclusive offset
For this function the power stage has to be disabled!
OK
Cancel

Figure 24 Select button “OK”

The saving-process is displayed in an information window.

(7) Select the “OK” button in the Information window to confirm that the parameters have been saved.

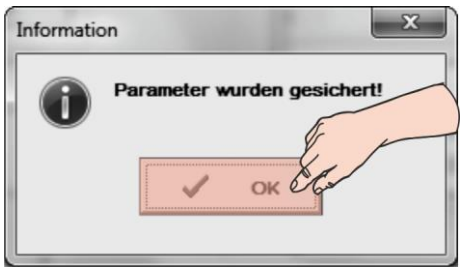

Figure 25 Select button “OK”

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5.2 Carry out homing run

(1) Select the icon „REF" (homing position) in the symbol line of the S2 Commander.

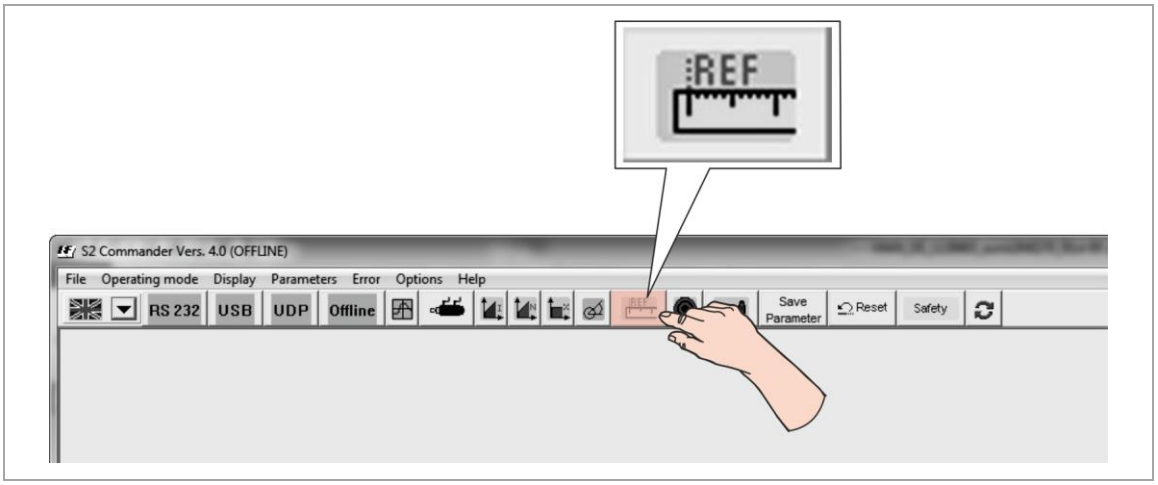

Figure 26 Select "REF" icon

(2) Select the button "GO!" (GO!) to start homing run.
Note: The controller has to be enabled for this purpose!

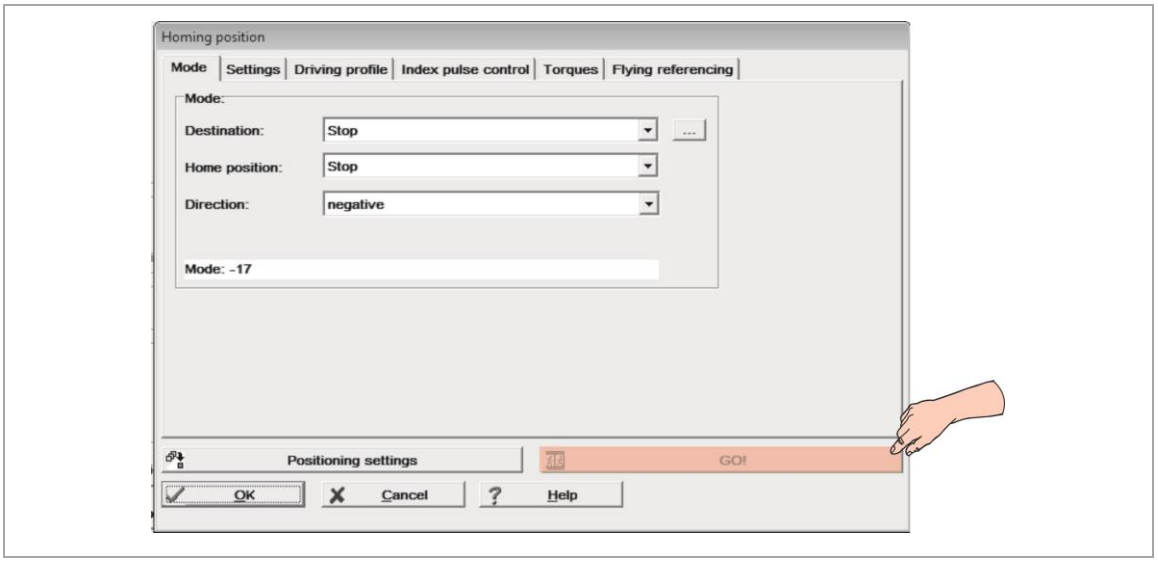

Figure 27 Select button "GO!"

The homing run is carried out.

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(3) After successful homing: Select the tap “settings” (**Settings**) and select the button “Save to encoder” (**Save to encoder**) to save the basic parameters/reference position into the encoder.

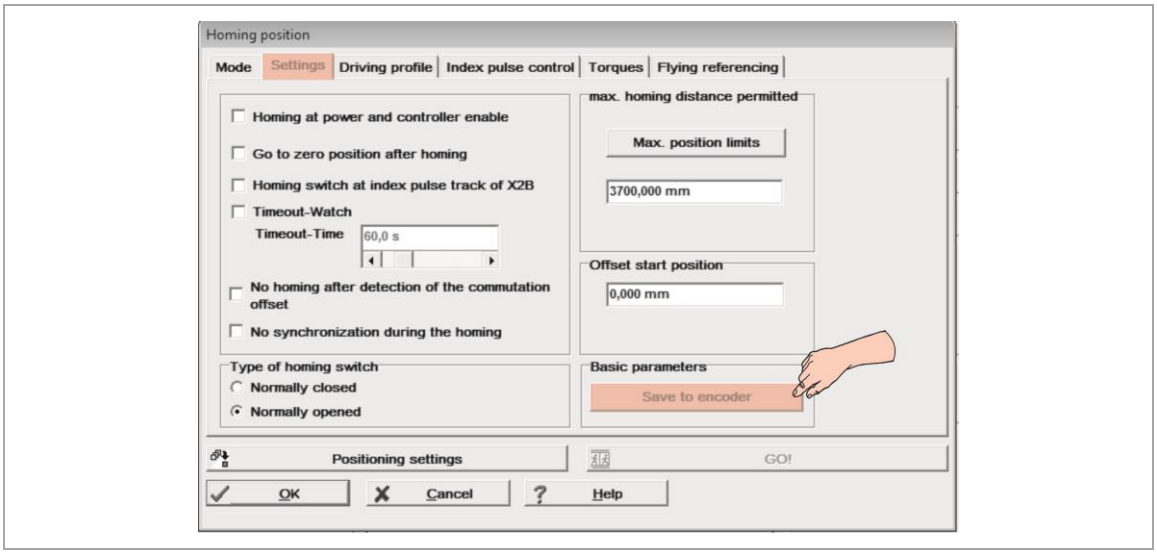

Figure 28 Select button “Save to encoder”

(4) Confirm the storage by selecting the “OK” button in the Save to encoder window.

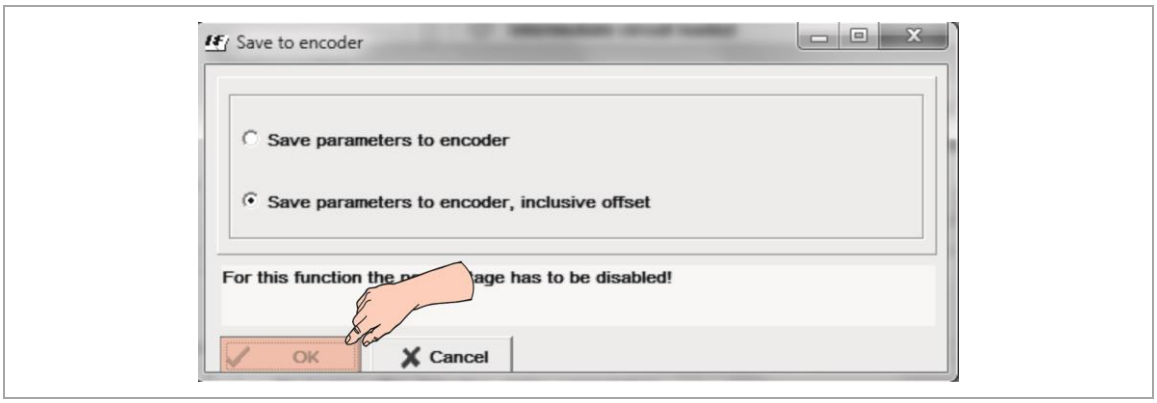

Figure 29 Select button “OK”

(5) Confirm the message of homing run with the “Yes” button.

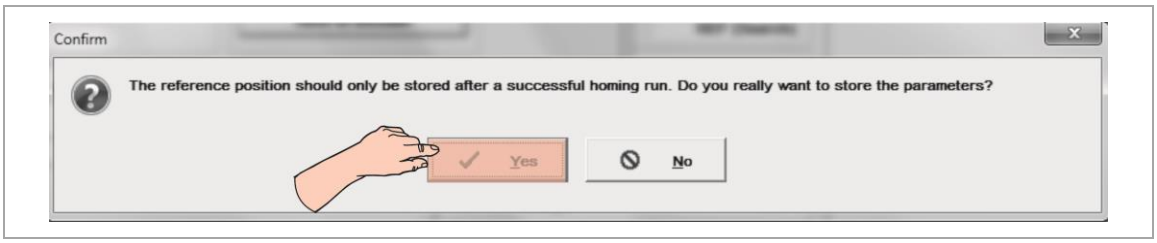
Confirm
The reference position should only be stored after a successful homing run. Do you really want to store the parameters?
Yes
No

Figure 30 Select button “Yes”

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(6) Select the button “OK” in the Information window to confirm that the parameters have been saved.

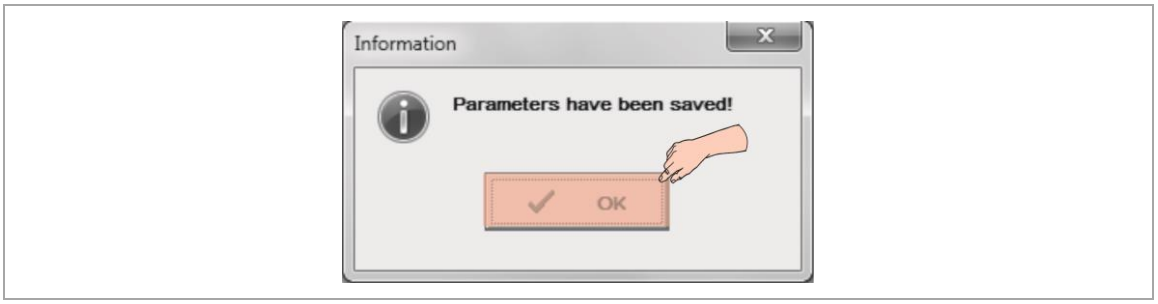

Figure 31 Select button “OK”

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6 Maintenance

⚠ WARNING

Warning of dangerous electrical voltage.

The system must be powered down for all assembly, disassembly or repair work.
Non-observance of the safety provisions may cause death.

ATTENTION

Any repairs must only be performed by specialist personnel who have read and understood these original operating instructions.
Only use genuine spare parts, since IEF-Werner GmbH will not assume any warranty otherwise.

6.1 Maintenance of the Visual Measuring System

ATTENTION

Changes and repairs on this measuring system must only be performed by the manufacturer or persons authorised by him.

The manufacturer shall not be liable for any damage caused by non-authorised changes to the measuring system. Unauthorised actions cause all warranty claims to lapse.

The measuring system is generally maintenance-free.

The absolute length system used in the linear unit euroLINE 120 shows only slight contamination sensitivity.

Since the length system is integrated into the linear unit, regular cleaning is not necessary.

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6.2 Lubrication of Guide Carriage

The guide carriages are equipped with long-time lubrication for a running output or 10,000 km in the factory. For a higher running output, we recommend regularly relubricating the guides. Relubrication takes place with the lubricant Dynalub by a manual surge press (IEF-Werner item no.: 1055123) using four lubrication nipples attached to the carriage.

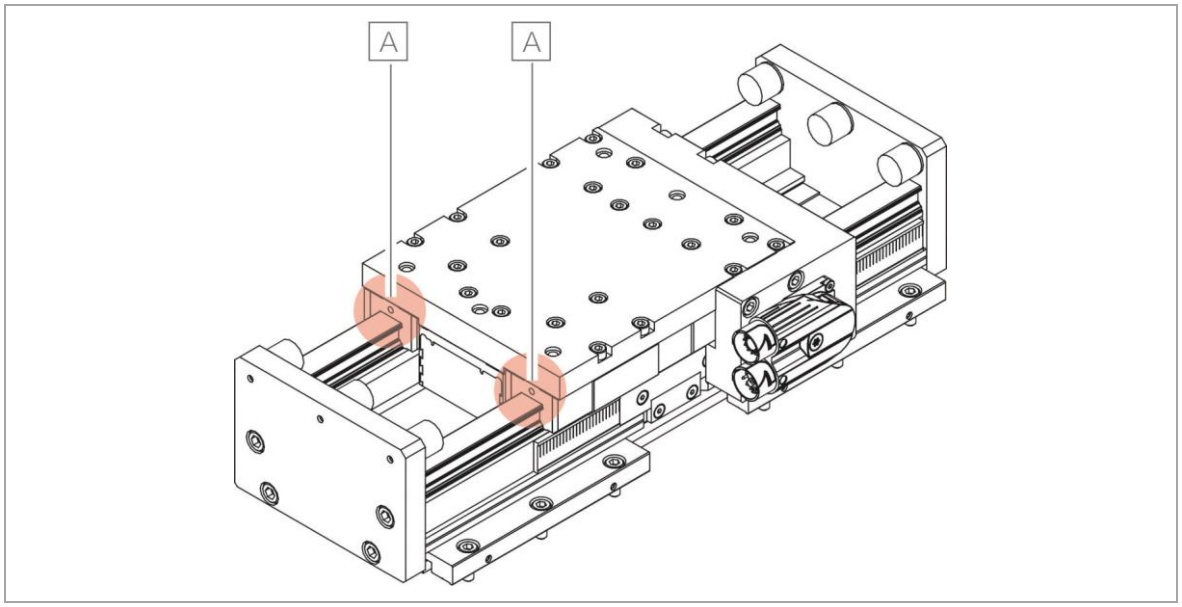

Figure 32 Lubrication of the module/guide carriages via lubrication nipples

A Hopper lubrication nipples (4 in total)

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6.3 Precautions by replacing the carriage

⚠ WARNING

Danger of crushing of limbs.

Due to strong magnetic pulls a risk of crushing of limbs (fingers) consists by replacing the carriage.

ATTENTION

When sliding the carriage off the guide system, the guide carriage can be damaged.

Remove the magnetic front plate before sliding the carriage off the guide rails. Otherwise the carriage might tilt and block due to the magnetic pulls.

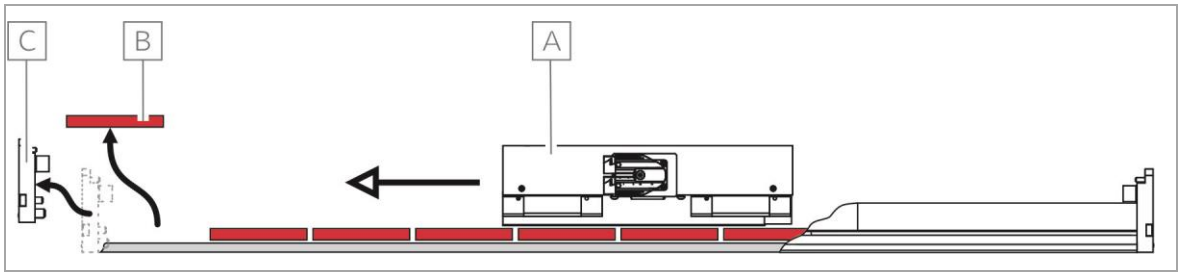

Figure 33 Replacing carriage

A Carriage (complete with guide carriage and coil unit)

B Front magnetic plate (shown removed)

C End plate

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7 Troubleshooting

Interference	Reason	Correction
Increased running noise	Nominal service life of guide carriage exceeded	Complete exchange of the guide carriages
	Torque load on guide carriage too high, causing play in the guide carriage	Complete exchange of the guide carriages
	Motor coil does not run "freely" and scrapes	Replace complete carriage unit
	Error in power electronics or control unit	Check, if required, exchange the power electronics, control
Linear drive unit does not move	Block from magnetic foreign parts in the area of the magnets	Remove foreign parts, Check motor coil for damage
	Motor coil does not run "freely" and blocks	Replace complete carriage unit
	Plugs loose	Connect clamps U,V,W Attention: Only when powered down
	Encoder line defective	Replace encoder line
	Measuring system defective	Check distance measuring head ↔ measuring tape; target = 0.15 mm +0.2/-0.1 Replace complete carriage unit
	Motor coil defective	Replace complete carriage unit
	Guide carriage defective (stiffness, block)	Replacement of the guide carriages, if required of the guide rails
	Error in power electronics or control unit	Check components, replace if necessary
Position loss	Measuring system defective	Check distance measuring head ↔ measuring tape; target = 0.15 mm +0.2/-0.1 Replace complete carriage unit
	Measuring tape contaminated, damaged	Check components, replace if necessary

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8 Parts Lists and Drawings

8.1 euroLINE 120, Part List TG1002844

Drawing item	Article no.	Designation
10	10002845	Basic body 120 complete
20	1125698	Carriage complete TM06 type: LM120-S1-LIC4 (illustrated)
20	1125943	Carriage complete TM12 type: LM120-S2-LIC4 (not illustrated)
30	1125766	End-plate
40	1125715	Clamping element
50	1114061	Magnetic plate TM 96 mm
55	1114060	Magnetic plate TM 144 mm
60	1002409	Guide rail type: LM 120
70	626037	Cylindrical screw, zinc-plated; type: M6 x 20
90	626061	Cylindrical screw, zinc-plated; type: M4 x 16
100	57384	Cylindrical screw, type: M5 x 12
110	626707	Cylindrical screw, zinc-plated; type: M3 x 12
170	1120771	Rubber metal buffer rework type: M4 x 6

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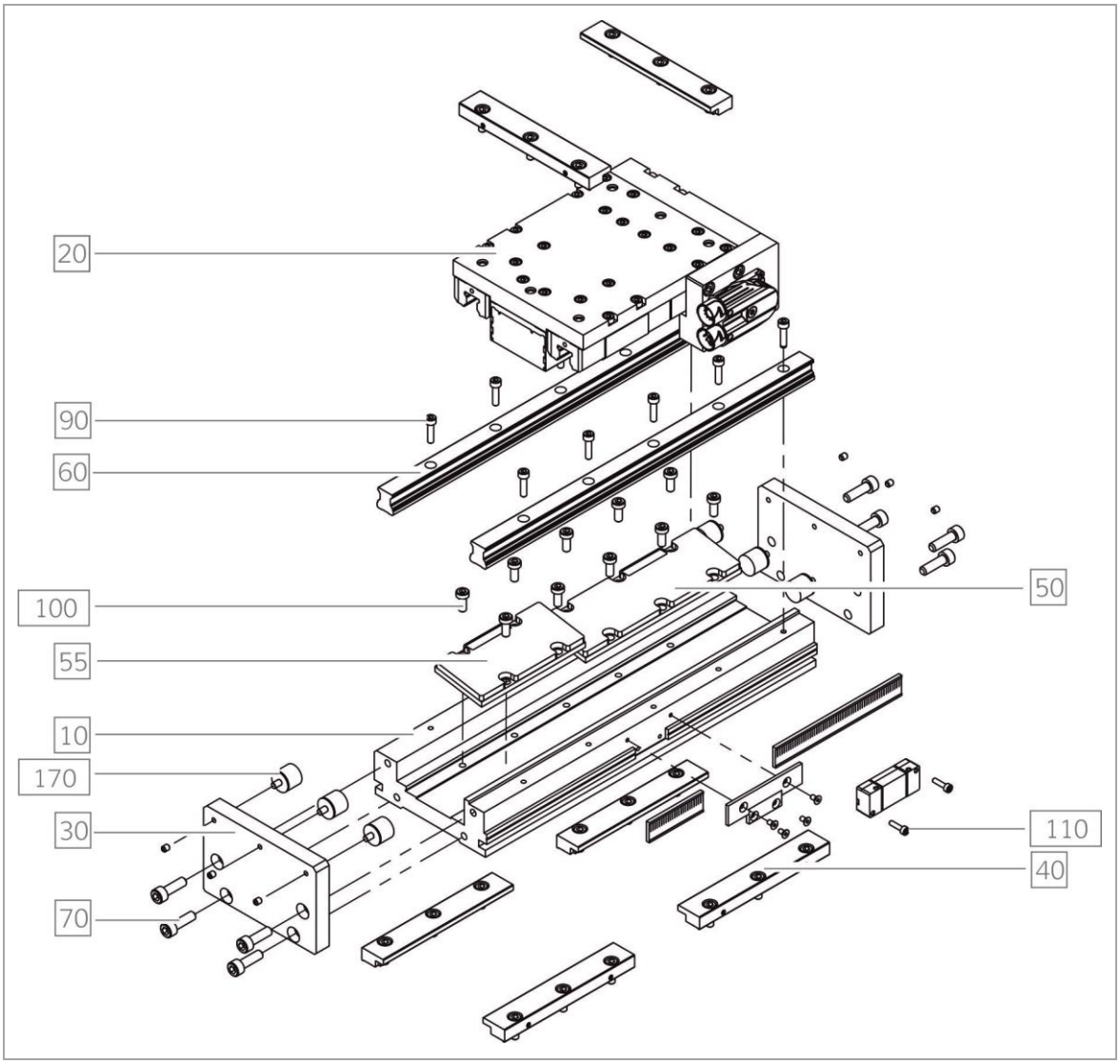

Figure 34 Exploded drawing TG1002844

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8.2 euroLINE 120, Standard Carriage, Length = 165 mm, Item No.: 1125698

Drawing item	Article no.	Designation
10	1125692	Carriage plate TM06 type: euroLINE 120
30	1125687	Cover linear motor cable type: euroLINE 120
40	1125685	Terminal box angle concealed socket type: euroLINE 120
50	1113933	Angle concealed socket 615/915 ytec
60	1029382	Guide carriage, type: Size 15, class P
80	1008664	Centering sleeve, type: ZHB-7
100	1114059	Coil unit type: TM6
110	626061	Cylindrical screw, zinc-plated; type: M4 x 16
120	626327	Cylindrical pin type: 5m6 x 16
130	626058	Cylindrical screw, zinc-plated; type: M5 x 25
140	626057	Cylindrical screw, zinc-plated; type: M5 x 20
150	626777	Cylindrical screw, zinc-plated; type: M3 x 8

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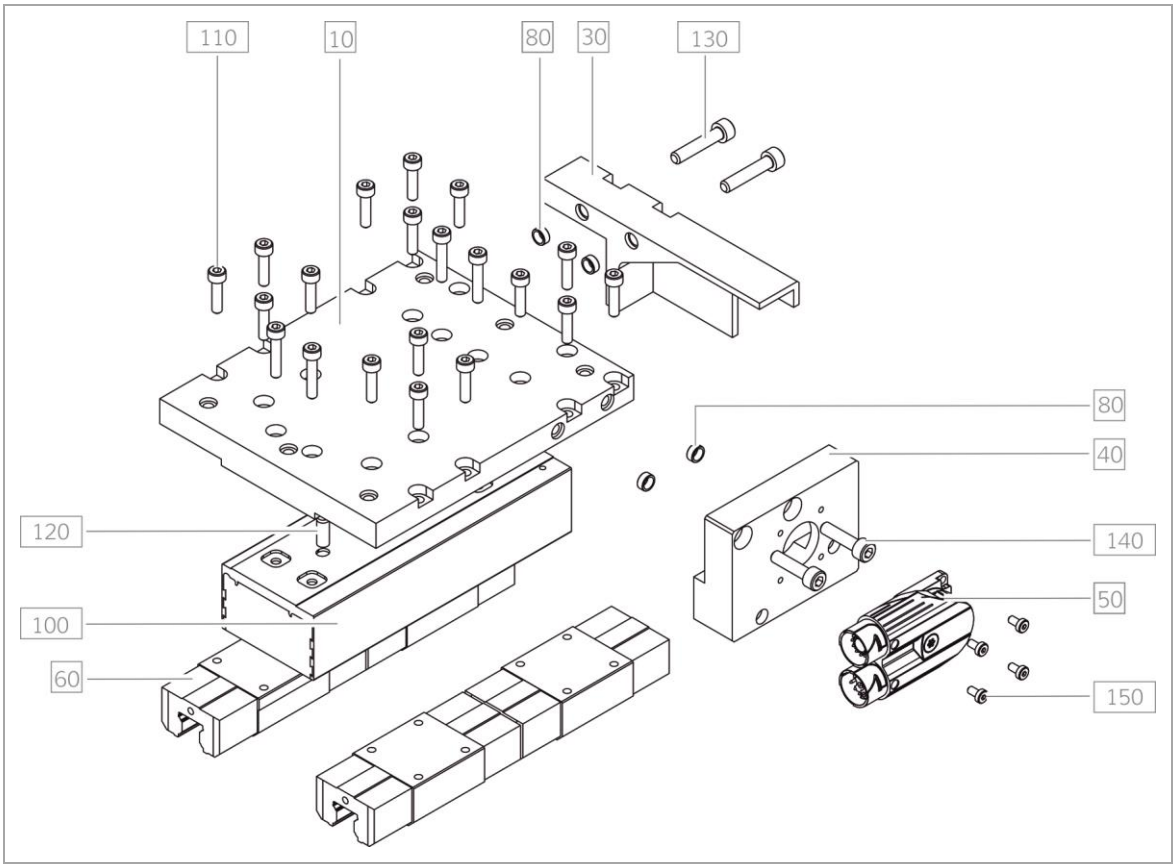

Figure 35 euroLINE 120, standard carriage, length 165 mm

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8.3 euroLINE 120, Long Carriage, Length = 263 mm, Item No.: 1125943

Drawing item	Article no.	Designation
10	1125936	Carriage plate TM12 type: euroLINE 120
30	1125687	Cover linear motor cable type: euroLINE 120
40	1125685	Terminal box angle concealed socket type: euroLINE 120
50	1113933	Angle concealed socket 615/915 Y-Tec
60	1029382	Guide carriage, type: Size 15, class P
80	1008664	Centrring sleeve, type: ZHB-7
90	627070	Cylindrical screw, type: M4 x 20
100	1114058	Coil unit type: TM6
110	626061	Cylindrical screw, zinc-plated; type: M4 x 16
120	626327	Cylindrical pin type: 5m6 x 16
130	626058	Cylindrical screw, zinc-plated; type: M5 x 25
140	626057	Cylindrical screw, zinc-plated; type: M5 x 20
150	626777	Cylindrical screw, zinc-plated; type: M3 x 8

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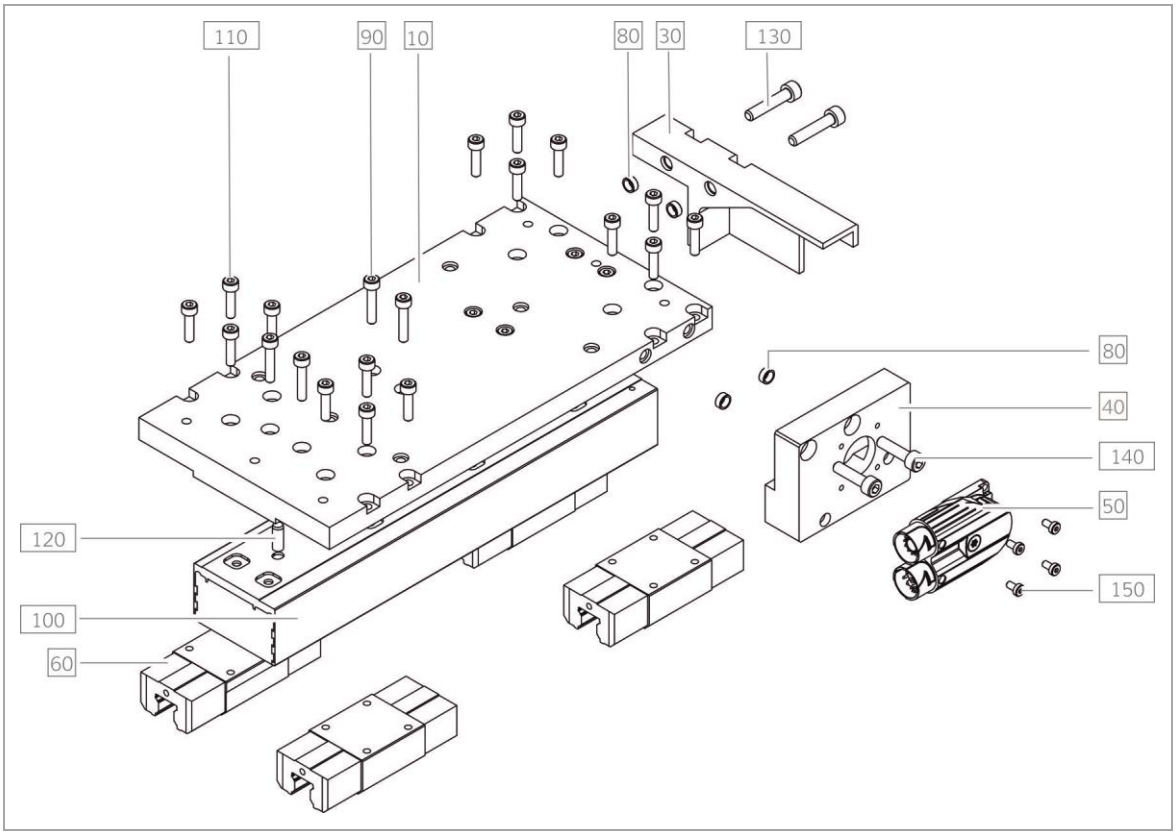

Figure 36 euroLINE 120, long carriage, length 263 mm

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8.4 Drawing Accessories

8.4.1 Centering ring 1008664

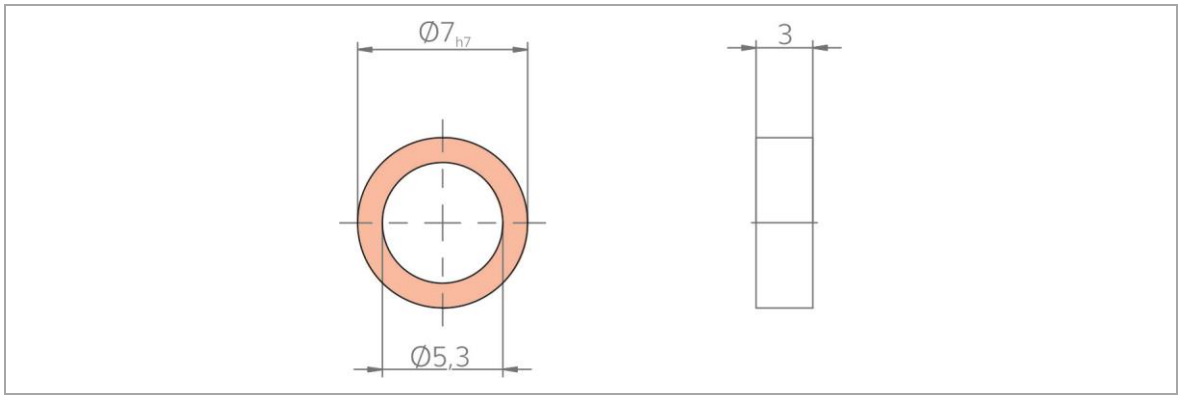

Figure 37 Centering ring

8.4.2 Clamping element euroLINE 120

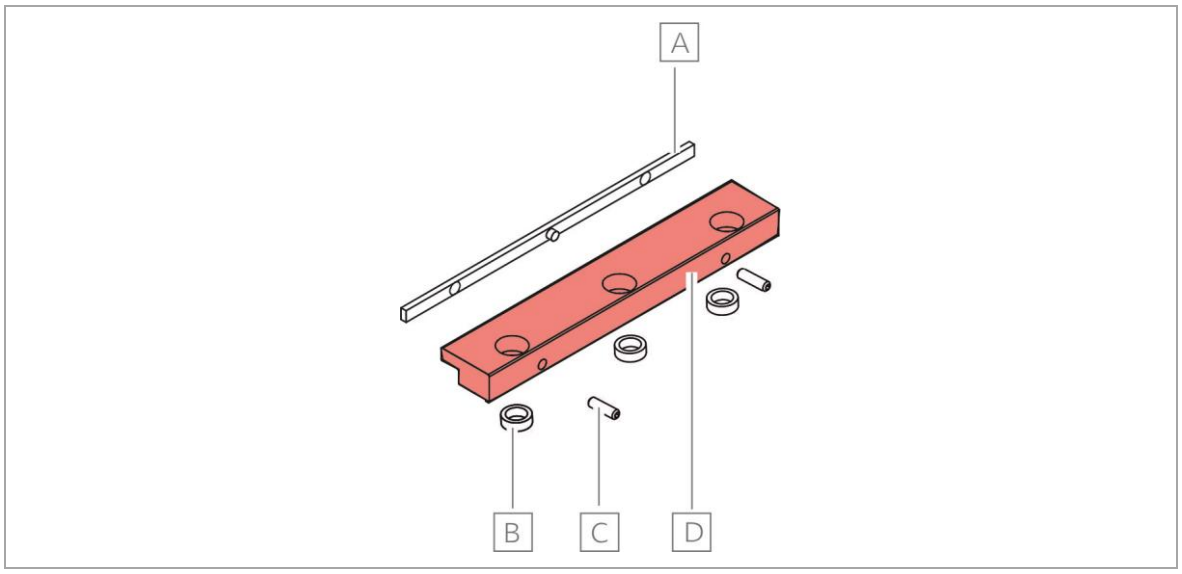

Figure 38 Clamping element (item no.: 1125715)

A Strip
B Centering ring
C Threaded pin, zinc-plated M4 x 12
D Clamping element (standard/cross installation)

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